

28  
**Ni**  
Nickel  
58.693

### Key Properties

|                   |                        |
|-------------------|------------------------|
| Atomic Mass       | 58.693                 |
| Category          | Transition Metals      |
| State at 20°C     | solid                  |
| Melting Point     | 1455°C                 |
| Boiling Point     | 2913°C                 |
| Density           | 8.908                  |
| Electron Config   | [Ar] 3d84s2            |
| Electronegativity | 1.91                   |
| Year Discovered   | 1751                   |
| Discovered By     | Axel Fredrik Cronstedt |

### Did You Know?

- 1 The Earth's core is believed to be made of an iron-nickel alloy.
- 2 The U.S. five-cent coin, the 'nickel', is actually only 25% nickel and 75% copper.
- 3 Most meteorites contain nickel, so finding nickel in the ground can be a sign of a past impact.
- 4 Nickel-plated objects are highly resistant to corrosion, and the process is often used for protective coatings.
- 5 Some people have a common skin allergy to nickel, which can cause a rash (contact dermatitis) from contact with jewelry, buttons, or coins.

#### APPEARANCE

Nickel is a hard, silvery-white, lustrous metal.

#### SUPERHERO PERSONA

*"The Tough Coin, a corrosion-resistant hero who makes up our money and toughens up stainless steel."*

#### EVERYDAY CONNECTION

Nickel is found in the five-cent nickel coin in US currency.

#### POP CULTURE

Nickel is a common metal used for currency in futuristic and post-apocalyptic settings.

## Nickel (Ni): The Hard, Versatile Metal

Nickel is a silvery, hard, and magnetic metal that stands out for its toughness and excellent resistance to corrosion—even at high temperatures. Pure nickel isn't used much, but it's a key ingredient in many important alloys that shape our modern world.

### Why Is Nickel Useful?

Nickel's strength, corrosion resistance, and ability to form alloys make it incredibly valuable.

**Alloys:** Nickel is a major component of stainless steel, giving it its famous rust resistance. Another alloy, nichrome (nickel + chromium), resists corrosion even when glowing red-hot, which makes it ideal for toaster and oven heating elements.

**Batteries:** Rechargeable nickel-cadmium (NiCd) and nickel-metal hydride (NiMH) batteries are widely used in electronics and hybrid vehicles.

**Coins:** Nickel has been used in coins for centuries. The U.S. five-cent coin ("nickel") is actually 25% nickel and 75% copper.

**Other Uses:** Nickel is used for plating metals to prevent corrosion, in copper-nickel alloys for seawater pipelines and desalination plants, and as a catalyst to harden (hydrogenate) vegetable oils.

### Biological Role & Natural Abundance

Nickel is essential for some plants, though its role in animals is less clear. Some nickel compounds can be harmful—certain forms are cancer-causing if inhaled, and some people are allergic to nickel when it touches their skin.

Much of Earth's nickel may have arrived with meteorites, which are richer in nickel than Earth's crust. In fact, one of the world's largest nickel deposits in Ontario, Canada, is thought to come from an ancient meteorite impact. Today, most nickel is extracted from iron-nickel sulfide ores and is often obtained as a by-product of copper refining.

### History of Discovery

**Early Use (200 BC):** In China, a zinc-nickel alloy called pai-t'ung ("white copper") was already in use.

**Discovery (1751):** Swedish mineralogist Axel Fredrik Cronstedt was studying a mineral thought to contain copper. Instead, he isolated a brand-new metal, which he named nickel.

**Proof of Element (1775):** Chemist Torbern Bergman finally produced pure nickel, confirming it was a distinct element.